NASA Resources
for 7th Grade Math classes

For NC 7th Grade Math Obj. 7.RP - Analyze proportional relationships and use them to solve real-world and mathematical problems.

- **Lesson Plan: Proportional Relationships -** Students use simple proportions and fractions to explore the number of stars in the Milky Way, and the relative sizes of some famous stars compared to our own sun. https://spacemath.gsfc.nasa.gov/Modules/6Module7.html
- **Lesson Plan: Exploring Planetary Moons** - This book introduces students to some of the most unusual places in our solar system that are not planets. Using simple proportional relationships and working with fractions, they will study the relative sizes of the larger moons in our solar system, and explore how temperatures change from place to place using the Celsius and Kelvin scales. https://www.nasa.gov/pdf/752224main_Exploring_Planetary_Moons.pdf

For NC 7th Grade Math Obj. 7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers.

- **Lesson Plan: Fraction Operations -** Students will use fractions to understand land use on Earth based upon Landsat data. https://spacemath.gsfc.nasa.gov/Modules/6Module5.html
- **Lesson Plan: Words into Mathematics -** Students will read a paragraph describing the increases and decreases in the orbit altitude to calculate the final orbit altitude. https://spacemath.gsfc.nasa.gov/Modules/7Module1.html

For NC 7th Grade Math Obj. 7.EE Use properties of operations to generate equivalent expressions. Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

- **Lesson Plan: Exploring the Milky Way -** These problems cover basic scientific notation skills and how they apply to working with 'astronomically large' numbers. It also provides exercises in plotting points on a Cartesian plane to map the various features of our Milky Way. https://www.nasa.gov/pdf/752206main_Exploring_MilkyWay.pdf

For NC 7th Grade Math Obj. 7.G Draw, construct, and describe geometrical figures and describe the relationships between them. Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

- **Lesson Plan: MMS Mission -** This guide focuses on two-dimensional and three-dimensional geometry to assist students in developing spatial skills. There are also some activities that involve algebra and computational skills. https://mms.gsfc.nasa.gov/documents/education/math_guide/mms_math_guide.pdf

- **Lesson Plan: Geometry and Angle Relationships -** Students will use the Pythagorean Theorem to determine distance between a series of hypothetical exploration sites within Gale Crater on Mars. https://spacemath.gsfc.nasa.gov/Modules/8Module5.html

- **Lesson Plan: The Volume of Spheres and Cylinders -** Students will estimate and calculate volumes of comets, asteroids, and spacecraft. https://spacemath.gsfc.nasa.gov/Modules/7Module9.html

- **Lesson Plan: Exploring Solar Alignments with Simple Mathematics and Geometry -** 10 problem sets that introduce you to the very simple geometry that goes along with designing monuments to favor certain orientations and alignments. https://sunearthday.nasa.gov/2011/articles/ttt_72.php

For NC 7th Grade Math Obj. 7.SP Use random sampling to draw inferences about a population. Draw informal comparative inferences about two populations. Investigate chance processes and develop, use, and evaluate probability models.

- **Lesson Plan: Probability and Predictions -** Students will study the statistics of planets outside our solar system and estimate the number of Earth-like planets in the Milky Way galaxy. https://spacemath.gsfc.nasa.gov/Modules/7Module10.html

- **Lesson Plan: Mean, Median, Mode** - Students will explore the statistics of various types of space weather storms by determining the mean, median and mode of different samples of storm events. https://spacemath.gsfc.nasa.gov/Modules/7Module7.html

- **Lesson Plan: IS THERE LIFE ON OTHER WORLDS? THE DRAKE EQUATION*** - Goals are to 1. estimate the number of worlds in the Milky Way galaxy that have life; 2. think about the size and composition of the galaxy and how it affects the possibility of extraterrestrial life; 3. understand and estimate the terms of the Drake Equation. https://www.cfa.harvard.edu/seuforum/exhibit/resources/CQEdGuide.pdf#page=60

Videos:

- **How to Calculate Sea Ice Changes -** NASA has released a series of three educational videos to illustrate how math is used in satellite data analysis. https://www.nasa.gov/content/goddard/how-to-calculate-sea-ice-changes/
- **Real World: What Time Is It In Space? -** The International Space Station, or ISS, orbits Earth once every 90 minutes. Learn how astronauts keep track of what time it is while on-board the ISS using Universal Time. https://nasaeclips.arc.nasa.gov/video/realworld/real-world-what-time-is-it-in-space
- **STEM on Station - Mathematics** - YouTube playlist with four segments covering volume, orbit and other math applications. https://youtu.be/gGI45yjDgrU

Other Resources:

Space Math - This website contains collections of activities with authentic glimpses of modern science and engineering issues, often involving actual research data. The problems were designed to be 'one-pagers' with a Teacher's Guide and Answer Key as a second page and are organized based on grade level, CCSS-M, and STEM Modules around a single topic.
https://spacemath.gsfc.nasa.gov/SpaceMath.html

Year of the Solar System - This math guide offers educators and students insight into the behind-the-scenes role that mathematics plays in solar system exploration through engaging real-world problems.
https://spacemath.gsfc.nasa.gov/YOSS/YOSS.pdf